

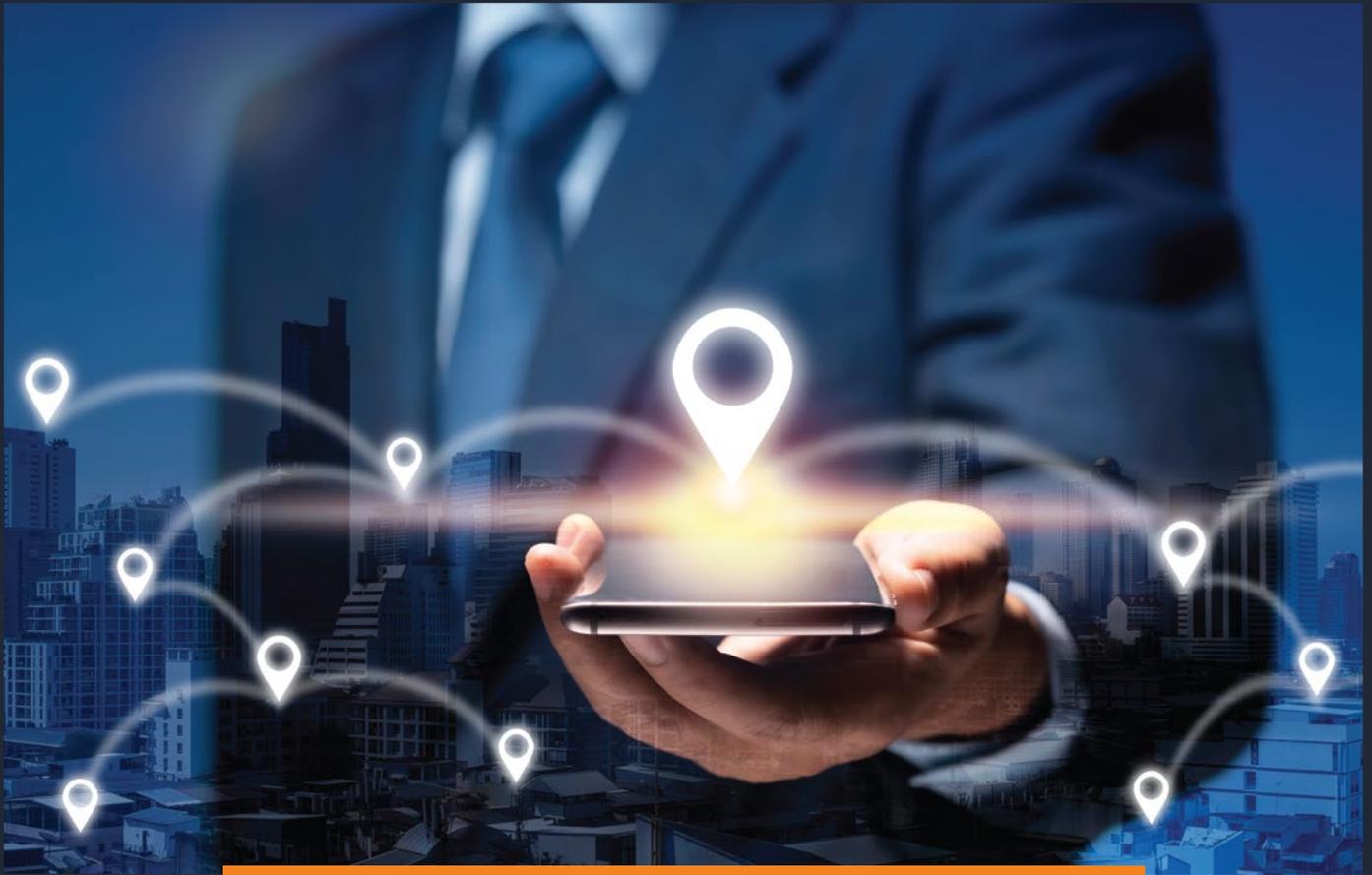
Geolocation Testing

Ensure successful execution of every scenario



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Introduction

The significance of geolocation has made headways since the emergence of internet connected devices. Before that the usage was confined to a certain technologies and use cases. The word Geolocation is made from two words; Geography and location. Finding geographical location of a person or electronic devices by using location technologies such as GPS or IP address, come under geolocation.

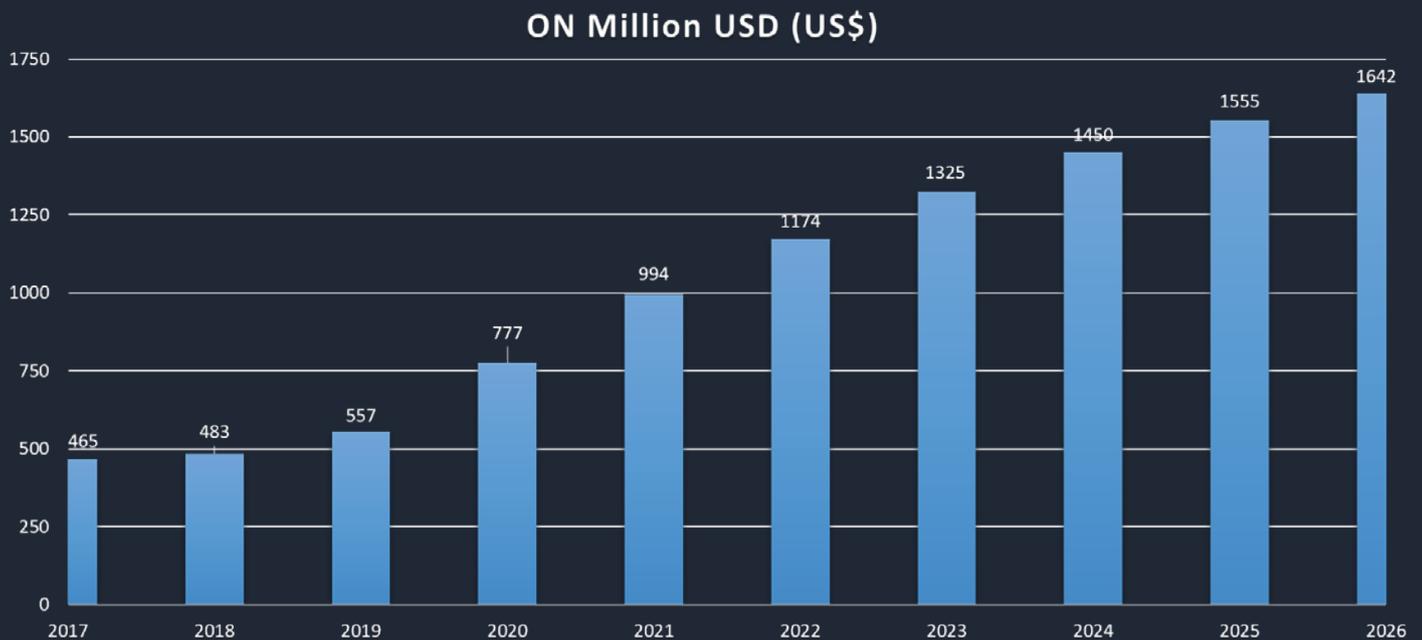
To exemplify, Uber and Tinder are location based applications i.e. their functionality and operation completely depend on geolocation. It has become the backbone for these businesses.

Also, who hasn't heard about immensely popular game of the time, Pokemon?

Today, there are thousands or more use cases of geolocation widely spread across different industries or verticals for instance travel & tourism, sports/fitness apps, navigation tools, social media, delivery services etc, leveraging numerous benefits in multiple domains.

This whitepaper will help audience gain a significant understanding of geolocation testing via brief learning of associated features, benefits, tools and more.

- In 2021, the navigation segment had generated a revenue of USD 994 million. This is projected to be USD 1174 million this year.
- Total revenue in the navigation segment is projected to reach US\$1.17bn in 2022.
- Total revenue is expected to show an annual growth rate (CAGR 2022–2026) of 8.75%, resulting in a projected market volume of US\$1.64bn by 2026.



“

I bet people living in the 1970s would not have thought that thirty years later, in 1999, a mobile device would get an in-built geolocation system to fetch the user's location. Since then, the question has not been 'how' to implement a geolocation system but 'where' to implement it. From mobiles to vehicles to watches, almost anything today may have geolocation implemented.

”



What is Geo-IP?

Geo-IP is the process of identifying the user's geographical location by determining the IP address. When a user accesses a website or downloads any music or apps or games in mobile or PC, IP address is acquired by the server which hosts them. Geo-IP works by looking that IP up in the database to check where the IP was assigned. Geo-targeting is one of the most common applications of GeoIP.

What is Geolocation Testing?

This is a technique where a test engineer performs testing on a website or mobile application from a set of IPs from various geographical locations across the globe. In case of some more than other application, geolocation testing is critical, such as a food delivery app.

Why Geolocation Testing?

Geolocation testing is performed in order to evaluate the performance, compatibility, language, responsiveness of the hosted website or app in accordance to the geography. Importance of geolocation testing increases for application where security is dependent on it, for example Gpay.



What Are the Features Covered in Geolocation Testing?

- 1 Performance
- 2 Language
- 3 Compatibility
- 4 Notifications
- 5 Time zones
- 6 Usability
- 7 Accessibility
- 8 Localized support or configuration

Performance

Geo-Distributed load testing can be performed by using regional servers across different locations around the globe to stimulate virtual users on each server to test the location-based impact on performance of a website or application. This test can help in understanding effective testing of load balancers and routing components, scalability testing for multiple locations resource planning, testing location-dependent requests and responses etc.

Language

It is of no doubt by now that website language can be different based on the location of the user. The need to test this is of great magnitude as important information like addresses, amount of payment to be made, and other delicate information is highly important to the end-users. The steps to execute this is similar to the above use case (Performance testing across a globally distributed network).

Compatibility

Applications or websites may tend to behave differently based on the locations because of the norms followed by specific regions. It is the responsibility of testers to assure that these changes don't cause hindrances in the functionality of the application. Also, in this process, it is necessary to check application compatibility for all users accessing from regions with or without any such norms.

Notifications

Consider an application or a website that broadcasts weather reports. For this application/website to be adored by end users, it has to keep giving important weather alerts consistently so as to aid farmers, fishermen and other users. Such information can penetrate the audience better if shared as alerts through notifications. Geolocation testing ensures such notifications are delivered only to end-users who deem it important.

5

Time zones

A forex trading application available across different time zones has users who trade from their locations. It is important that this application shows the current prices of all the currencies and the respective exchange rates based on the end user's location. Geolocation testing can ensure the correct delivery of such data.

6

Usability

Consider a learning platform where a student pays for the courses or activities within the application. The modes of payment can be different based on the location. It is important to check if the end-user is able to make payments through modes that are only available in their regions. The usability of the feature within the application needs to be checked.

7

Accessibility

Consider a news sharing application that is accessible globally. For this application to be used widely by all types of users, it is well advised to have a voice-over service that reads the content in local language to address the needs of people with all disabilities.

8

Localized support or configuration

Consider an online gambling application. The gambling rules can be different based on region. It is the tester's responsibility to make sure that the user can access all the other features apart from the features restricted based on the user's location.

The following domains exhibit the significance of Geolocation testing:

- 1 Fetching location data
- 2 Adhering to & displaying results based on content distribution laws
- 3 Customizing ads
- 4 Security



1 Fetching location data

We have instances in real life where the geolocation of the device is directly used in applications. Examples for this include the Google Maps app using the device geolocation to show the user their current location. Other examples include fetching relevant results according to the location for applications like Uber and Zomato.

2 Adhering to & displaying results based on content distribution laws

While broadcasting worldwide, the content sensitive to viewers' emotion should not be broadcasted to all users. An example is '*goldfish cannot be portrayed in a big glass bowl in Italy*'. Any content you show, videos, images, or any item, should be in adherence to national laws. Geolocation testing brings rich convenience to such requirements as it helps you check if you are adhering to these laws or not.

Customizing ads

Advertising is a billion-dollar industry today. There are always advertisements targeted at a certain bunch of people, whether B2B or B2C, advertisement is a thriving and widely adopted method of reaching to potential customer base. Geolocation testing helps understand if the desired criteria is met. An example of this can be a certain ad appearing in different language in different states in India. Enabling such a mass industry with a facility to check if the target audience is reached makes a massive difference in the revenue generated.

Security

Security can be an important reason to use geolocation testing. A real-world example of this can be Google pay using location services while making a payment. Assume a transaction happens from a given account in one country, and another transaction happens from a different country in span of a few minutes, despite the 10 hours' time zone difference, it is evident that something is wrong.

“ The interesting products out on the Internet today are not building new technologies. They're combining technologies. Instagram, for instance: Photos plus geolocation plus filters. Foursquare: restaurant reviews plus check-ins plus geo ”

– Jack Dorsey

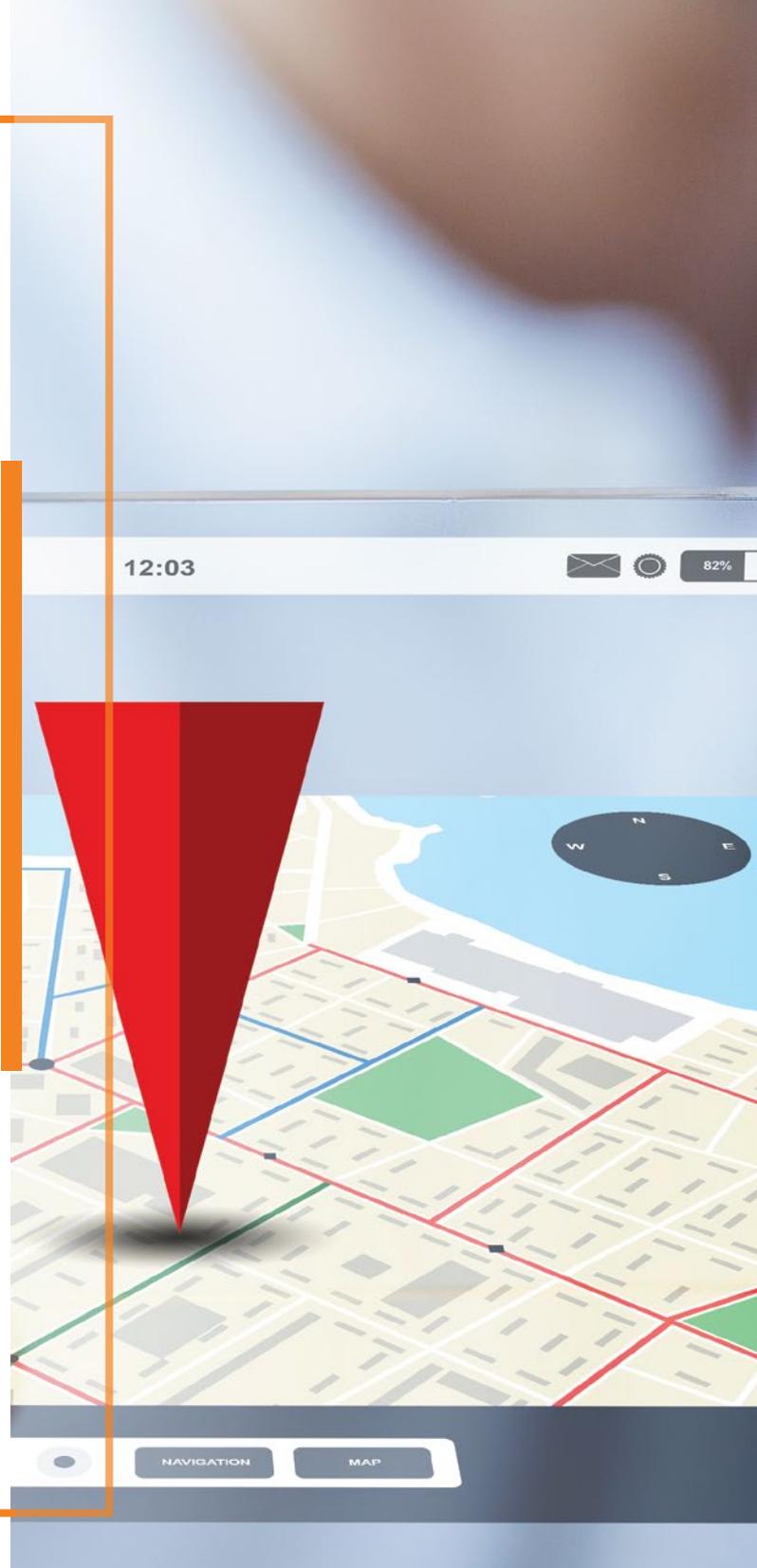


How is Geolocation Testing Performed?

Geolocation testing is performed by simulating the application by selecting the hosted IP addresses. By doing this the application reacts as if the app or website is now being accessed from specified country, thereby helping the developers monitor the traffic of the application.

Some of the tools that support Geolocation Testing are:

- 1 Browser stack
- 2 LamdaTest
- 3 Chrome
- 4 Using VPN to change location
- 5 Automated Geolocation Testing with Testsigma



Testing using Browserstack

Browserstack offers the facility to test Geolocation in Live & App Live options. When the desired mobile app/website is loaded, there is an option to change the location by choosing the desired country and then continue accessing the application under test. This way, the simulation is done, and the testers measure the parameters.



Testing using Lambda Test

LambdaTest can be accessed from google or Github accounts. It provides a platform for testers to perform testing, which include:

- 1 Geo targeting**

This feature enables the tester to check if the content on display is localized as per the country, state or a particular region. Search Engine results page should display content based on the location.
- 2 Geo blocking**

With LambdaTest's geolocation testing, user can test if or not, blocked/restricted image, content, or video is blocked as intended from different Geolocations
- 3 Geo localization**

To test if features like language translation, currency change, time zone changes, or any other changes in content, no matter how small, are reflecting according to different locations or not.
- 4 Run automated tests from various locations**

Speed up test run from different geolocations by running automation test scripts. All one needs to do is pass a capability for geolocation and the automation tests will automatically run from the desired location.

Testing using Google Chrome Developer Tools

Google chrome already has geolocation features, the testers can change the location from the developer tools section to anyone in the given list. Steps to change the location in Google Chrome:

- Press Ctrl + Shift + P in Developer tools. (to open developer tools, right click on the web page and click on inspect element).
- To open up the sensors list Type “Sensors”, and select “Geolocation” from the list.
- It will open up a list of locations to choose from.
- Choose the desired location and perform testing.





Using VPN to Change Location



Installing VPN and putting it to use to change our current location is one of the easiest ways to test. Virtual Private Network (VPN) is comprehensively used in various domains. Organizations use VPN to create a secure network or people to change their server location to access banned content in their current region are two examples. There can bring a few barriers to testing as not all VPNs hold high efficiency, and there are chances of third-party applications (from which the data is fetched) recognizing and blocking the VPN usage.



Automated Geolocation Testing with Testsigma

The simplest and most efficient way to perform geolocation testing is to use a tool that is built for this purpose. One such tool is Testsigma. Testsigma is about performing geolocation testing through automation.

These automated geolocation tests can be combined with a variety of other testing paradigms, such as end-to-end regression to simulate a complete test environment in a single place.

To perform geolocation testing with Testsigma, we need to follow three different steps for three different platforms: the web application, an iOS application, and an android native application.

Web Application

Geo testing on the web application requires setting a few capabilities on Testsigma. These are as follows:

```
capabilities.setCapability("selenium_version", "3.141.59");
capabilities.setCapability("timezone", "UTC-8:00");
capabilities.setCapability("geoLocation", "US");
capabilities.setCapability("chrome.driver", "78.0")
```

selenium_version:

The selenium version to be used for executing the tests.

timezone:

The timezone in which you want to execute the test. In the above example, the timezone is set to UTC-8 which is California's timezone.

geolocation:

The geolocation takes in the country code from which we want our tests to be executed. For example, here the web application will be mocked to open from the United States.

Android Application

Geolocation testing on the android native application can be done by setting the browserstack.timezone capability.

Capability	Description:	Expected Values:
browserstack.timezone	The timezone you want to run the test in	A string New_York for America/New_York, La_Rioja for America/Argentina/La_Rioja See the complete list of supported values in the timezone capability



Geolocation Testing on iOS

Follow the steps below to perform geolocation testing on iOS devices:

- Install the iMyFone AnyTo application on windows machine.
- Plug in apple device through USB.
- Click on trust this device.
- Click on Get started by keeping the apple device unlocked.
- If the AUT is open/ running in the background, please close it before moving on to the next step.
- In the search bar type the location you want to move to and click on move.
- An alternate method for this step is to click on the location and press on move.
- Open the AUT and execute the desired test steps.

Reference links:

- <https://testsigma.com/blog/geolocation-testing-how-can-i-test-my-website-in-different-locations/>
- <https://www.lambdatest.com/blog/how-to-test-geolocation/>
- <https://www.statista.com/outlook/dmo/app/navigation/worldwide#revenue>

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